

[54] **SURGICAL ASPIRATING CANNULA**

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[58] Field of Search **128/276-278, 128/240-241, 350, 184**

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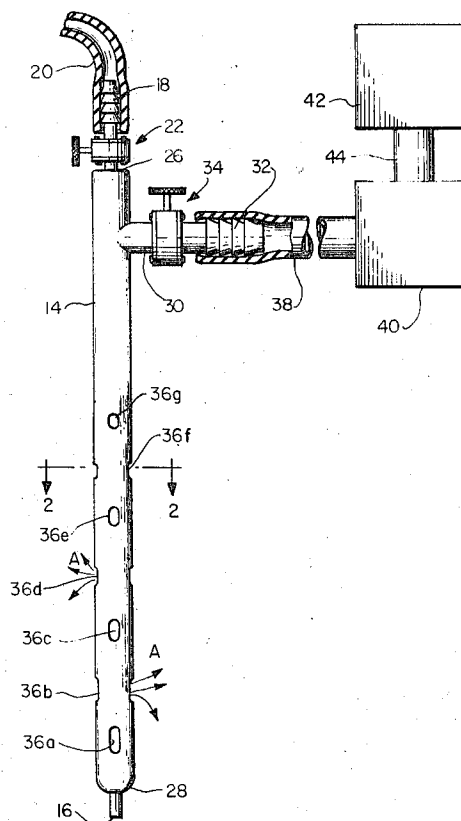
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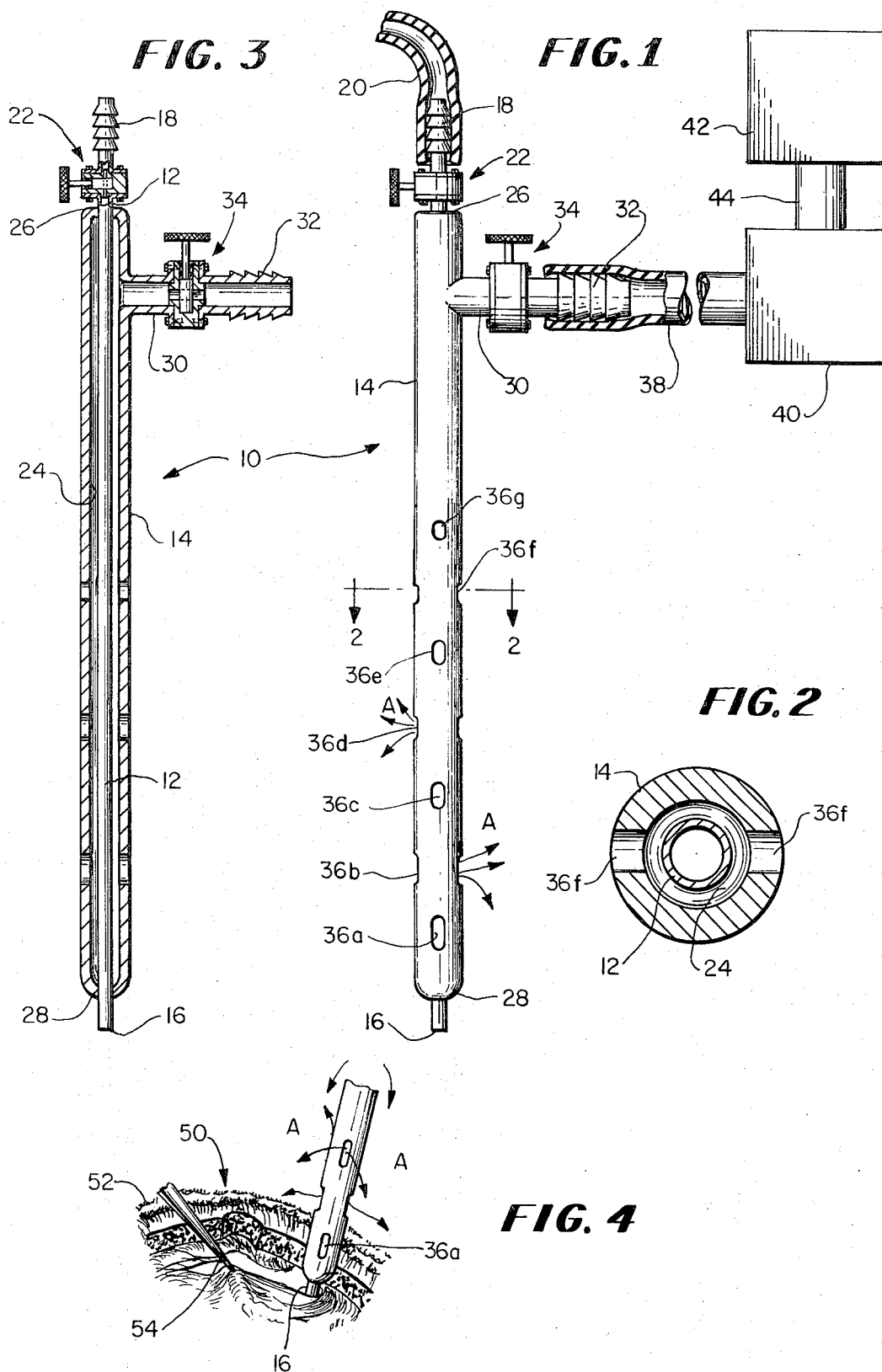
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ABSTRACT

A surgical aspirating or draining device having means maintaining a zone of contamination free gas about the surgical site to reduce a minimum introduction of contaminated particulate and gaseous matter into the surgical site, cavity or wound.

3 Claims, 4 Drawing Figures





SURGICAL ASPIRATING CANNULA

THE INVENTION

This invention relates to an improved surgical instrument and in particular to an aspirating or draining device for use during surgical procedures wherein means are provided to direct a contamination-free pressure fluid to the zone of the aspirating or draining tip of the device to thereby reduce to a minimum the introduction of contaminating gaseous and particulate matter into the surgical site.

The use of a aspirating or draining cannulae comprises accepted surgical procedures in the treatment of wounds and during and following surgery, particularly in the cavity areas of a being. It has been found, however, that the operation of conventional aspirating devices causes the in-flow of the surrounding, often contaminated atmosphere, together with contaminated particulate material suspended in the atmosphere.

It is a primary object of the present invention to provide a device which will permit operation of aspirating or drainage devices with a minimum of environmental contamination of the surgical site.

It is a further object of the present invention to provide such a device wherein at least the zone of the aspirating or drainage tip of the drainage cannula is continuously provided with a sterile, particle free gas, atmosphere, gas and humidifying liquid, or gas and suspended antiseptic or combinations thereof.

The invention will be more particularly described in reference to the accompanying drawings wherein:

FIG. 1 is a fragmentary partial sectional view of an embodiment of the present invention;

FIG. 2 is a section on line 2—2 of FIG. 1;

FIG. 3 is a fragmentary sectional view of a portion of the structures illustrated in FIG. 1; and,

FIG. 4 is a diagrammatic illustration of a use of the improved aspirating or drainage cannula of the invention.

Referring to the drawings, 10 generally designates the improved aspirating or drainage surgical cannula of the invention which generally comprises a first cannula 12 and a second cannula 14 maintained in the proximity of the first cannula 12. Each of the elements 12 and 14 is constructed of, for example, stainless steel where the device is manufactured for multiple use requiring sterilization between uses. The cannulae may also be constructed of plastic material and be disposed of after a single use.

Cannula 12 is open at end 16 and is provided at the opposite end 18 with a fitting adapted to receive a flexible tube 20 having its extended end connected to a source of reduced pressure as is well known in the art. Between fitting 18 and the open end 16, the cannula 12 may be provided with a manual control valve generally designated 22 whereby the surgeon or his assistant may regulate the aspirating affect of the device.

The second cannula 14, in the illustrated form of the invention, has a greater diameter than the first cannula 12 and the cannula 12 is internally received in the lumen 24 thereof. The upper end 26 of cannula 14 forms a seal about the external surface of the cannula 12 and a similar seal may be provided at end 28 adjacent the open end 16 of tube 12. Between ends 26 and 28 an inlet conduit 30 communicates with the lumen 24 of cannula 14. The extended end of conduit 30 is pro-

vided with a fitting 32, adapted to be connected to a source of pressure fluid as to be more fully described hereinafter.

The conduit 30 is also provided with a manual flow control valve 34 whereby the surgeon may adjust the release of the pressure fluid about the surgical site.

The cannula 14 is provided with a number of bores or openings designated 36a, b . . . g, which permit the flow of pressure gas, from within the tubular member, about the zone of the outlet tip 16 of cannula 12 and about an extended zone adjacent thereto. The flow of gases is diagrammatically illustrated by flow arrows A in, for example, FIGS. 1 and 4. In the illustrated embodiment of the invention, the openings 36a through 36g progressively vary in area from the largest adjacent the tip 16 to the smallest designated 36g as it has been found that such progressive size openings provide a more desired flow pattern for the contamination-free gases.

As hereinbefore discussed, inlet fitting 32 receives one end of a flexible conduit 38 having its opposite end connected to a source of contamination-free pressure gas generally designated 40. The reference character 40 may designate bottled nitrogen, CO₂, or compressed contamination-free and sterol air. In order to reduce fluid losses during operating procedures, humidifying means 42 may be connected via conduit 44 to the source of pressurized gas 40 and, as hereinbefore set forth, antiseptic fluids may be directed into the pressure gas directed into the space 24 between the pair of cannulae.

Referring to FIG. 4, there is diagrammatically illustrated use of the improved surgical aspirating device to remove blood and body fluids from the operating site generally designated 50. In FIG. 4, the tip 16 of the suction cannula 12 is illustrated within the incision and in close proximity to the surgical knife 54 and the lowermost of the pressure fluid outlets 36a also being shown below the outer surface 52 of the patient.

In general, it has been found that the pressure of the pressure fluid being supplied to the cannula 14 need only be slightly positive in respect to the environmental pressure and an operating range of, for example, one to about ten psig has been found to be useful.

It will be appreciated that aspirating cannula 12, when not needed, may be inactivated by closing valve 22 and the device may continue to be used to supply contamination free gas about the surgical site. Further, the device lends itself to a construction wherein the outer cannula 14 is in whole or in part formed of porous metal, glass or plastic as a replacement for the tube with discrete openings 36a - g, formed therein.

I claim:

1. A surgical aspirating or draining device comprising a first aspirating cannula, means connecting one end of said first cannula to a source of reduced pressure, the other end of said aspirating cannula being open to its environment at a surgical site, a second cannula fixed relative to the first cannula in substantially parallel relationship therewith, means connecting one end of the second cannula to a source of pressurized contamination-free gas at a pressure greater than the pressure of the environment of the open end of the first aspirating cannula, a plurality of outlets for the pressurized gas, at least one of the outlets being adjacent the zone of the surgical site of the open end of the first cannula whereby the zone of aspiration of said first aspirating

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cannula is bathed in gas issuing from said second cannula to thereby reduce introduction of contaminated particulate and gaseous matter into the surgical site.

2. A surgical aspirating or draining device comprising a first aspirating cannula, means connecting one end of said first cannula to a source of reduced pressure, the other end of said aspirating cannula being open to its environment at a surgical site, a second cannula maintained in proximity to the first cannula, means connecting one end of the second cannula to a source of pressurized contamination-free gas at a pressure greater than the pressure of the environment of the open end of the first aspirating cannula, a plurality of outlets for the pressurized gas, at least one of the outlets being ad-

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5 adjacent the zone of the environment of the surgical site of the open end of the first cannula whereby the zone of aspiration of said first aspirating cannula is bathed in gas issuing from said second cannula to thereby reduce introduction of contaminated particulate and gaseous matter into the surgical site, the first and second cannulae having concentric bores.

10 3. A surgical aspirating or draining device as defined in claim 1 wherein the area of the outlets in the second cannula progressively decrease in size from adjacent the open end of the first cannula toward said one end thereof.

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